

Niagara Falls Radiation Sites

Niagara Falls Boulevard, Holy Trinity Cemetery

General info

1978 DOE aerial radiological survey of Niagara Falls

- 15 areas identified greater than background (including NFB and HTC)
- This uranium and thorium-bearing slag believed to have originated from Union Carbide (Electromet) facility on 47th St.
- Approximately equal parts U-238 and Th-232, with lower Ra-226 levels
- Allegedly used as fill throughout Niagara area prior to licensing (“source material”)
- Private investigation by NFB property owner pointed to different origin for slag

General info (continued)

1984 Oak Ridge National Lab radiological survey of 100 elevated gamma anomalies potentially related to Lake Ontario Works

- Slag used as bedding for asphalt surfaces, driveways and gravel/fill operations (UMR)
- Identified as material (cyclo wollastonite) from the electrochemical production of elemental phosphorus at the former Oldbury Furnace in Niagara Falls
- Approximately equal parts Ra-226 and U-238, with elevated Th-232 levels
- Allegedly used as fill throughout Niagara area

Additional potential interest

A redeveloped property on 47th St. and Royal Ave.
(across the street from former Union Carbide facility)

- Redevelopment resulted in removal of 20,000 tons of radioactive waste from fill under former buildings from 1920s
- \$50M+ lawsuit by company against Occidental, Kimberly Clark and National Grid



Niagara Falls Boulevard (NFB)

Built ~1962 (conflicting info)

9524 NFB

- Rapids Bowling Center (formerly Pine Bowl) – bowling alley, bar/grill, asphalt parking lot (operates ~57 hrs/wk)

9540 NFB

- Greater Niagara Building Center, Inc. (formerly Dunn Tire, Baia Pontiac, Volkswagen dealer)

9524 Niagara Falls Blvd
Niagara Falls Boulevard

Niagara Falls Blvd

97th St

Niagara Falls Boulevard (NFB)

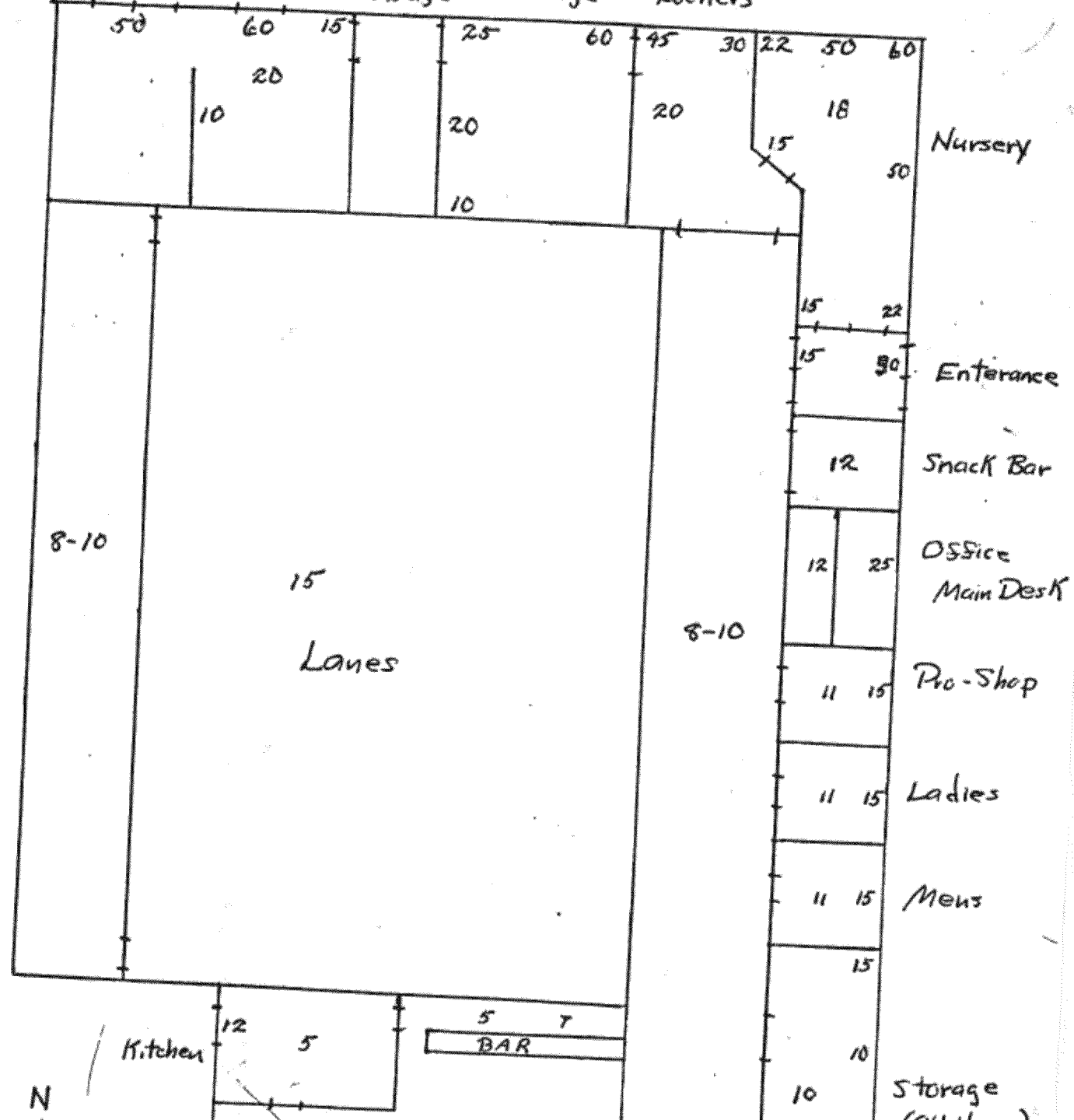
1979 NYSDEC/NYSDOH radiological survey

- Bowling alley and original portion of car dealer reportedly built in 1962, apparently before slag placement
- Slag used as fill and/or bedding for asphalt
- Structural additions to Baia Pontiac (1970s?)
- Highlights
 - Highest gamma readings at the Site are within the parking lot and unpaved fenced area
 - Highest gamma readings in bowling alley close to northern and eastern walls
 - Highest gamma readings in car dealer within the areas of the additions (office/storage room, collision shop/north stockroom, wash bay/south stockroom)

Niagara Falls Boulevard (NFB)

1979 NYSDOH radiological survey conclusions

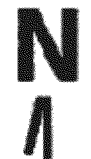
- Present use of property does not constitute a hazard to workers or general public that would necessitate a remedial action
- Owners required to report change in ownership, maintain surface integrity of parking lot, collect and dispose of loose aggregate in the parking lot, contact DOH before performing intrusive work
- Owners felt that NY did not know what they were doing since one agency almost closed their doors and the other indicated no problem
- Note: 1980 DOH committee determined that the 15 areas identified in rad survey did not pose a significant health hazard. Future remedial action was not ruled out.



Niagara Falls Boulevard (NFB)

2006 NYSDOH radiological surveys

- Reiterated previous conclusions (not an immediate public health concern)
- Also indicated that this is not a permanent solution and that they were working with DEC to come up with one
- Highlights
 - Gamma levels in the 9540 NFB storage/office area are “low” and prolonged use could result in exposure > 100 mrem/yr (worse case = 300 mrem/yr).....”well below OSHA limit for workers (5,000 mrem/yr”. Recommend this area not be used as an office.
 - Radon measurements in both buildings < 4 pCi/L (also took 3-month measurements)
 - Relatively low gamma readings identified along certain property boundaries



Niagara Falls Boulevard (NFB)

2013 - 2014 EPA Pre-remedial Site Investigation

- Surface measurements
- Soil/slag samples (including below slag)
 - Radioisotopes w/gamma spectroscopy
 - Gamma measurements with depth to 4 ft
- Radon and thoron measurements w/RAD7 radon detectors
- Highlights
 - Slag identified down to 0.5 ft. to 2 ft. depth
 - Ratios of individual isotopes were not consistent



Location ID	Gamma Radiation Exposure Rate (μR/hr)
G14	8.452
G15	7.773
G01	96.928
G02	151.864
G03	33.696
G04	121.794
G05	330.81
G06	97.744
G07	178.744
G08	118.032
G09	91.768
G10	11.644
G11	39.82
G12	123.654
G13	9.298
HSPA1	10.68
HSPA2	11.218
HSPA3	10.23
HSPA4	13.04
HSPA5	10.594
HSPA6	10.652
HSPA7	9.996
HSPA8	16.026
HSPA9	14.282
HSPA10	20.81
HSPA11	11.336
HSPA12	17.724
HSPA13	12.07
HSPA14	42.956
HSPA15	21.316
HSPA16	12.56
HSPA17	57.388
HSPA18	97.074
HSPA19	96.946
HSPA20	68.674
HSPA21	37.602
HSPA22	50.596
HSPA23	36.738
HSPB1	26.316
HSPB2	18.25
HSPB3	10.402

Legend

Pressurized Ion Chamber (PIC) Gamma Survey Point

- Background
- < 2x Average Background
- > 2x Average Background

NOTES:
 1. μR/hr = microRöntgens per hour, as measured with Rustr-Stokes RGS-151 pressurized ion chamber.
 2. View and/or elevation data are not shown.



Gamma Radiation Exposure Rate (μR/hr)



Niagara Falls Boulevard (NFB)

Changes to situation

- Bowling alley reportedly had a 2 ft. deep concrete floor placed at the rear portion of the building (locker room, arcade area, small bowling after the 1979/2006 interior measurements
 - Rad levels were reportedly “greatly reduced”.
- Former Dunn Tire is now occupied by an office furniture store
 - NYSDOH/NCDH reportedly spoke with owner about the portion of the building containing elevated gamma levels
 - Owner reportedly indicated they would not use it and would consider demolishing it

Holy Trinity Cemetery (HTC)

5401 Robert Avenue

- 31 acre property; area of concern 2.9 acres
- Includes a caretaker's house and maintenance garage
- Area of concern is an used portion of cemetery (no imminent plans of expansion into this area)
- Slag used as base for two never completed cemetery roadways (subsequently covered with soil)



104

Lewiston Rd

Spring St

George St

Irving Dr

Holy Trinity Cemetery

5401 Robert Ave

Riverdale Ave

Robert Ave

190

Military Rd

265

Elm Dr

Annover Dr

Old Lewiston Rd

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Holy Trinity Cemetery (HTC)

1980 NYSDOH and NCDH radiological survey

- Slag identified in abandoned roadbeds, including pushing up through the grass and where trees had grown
- Slag pile identified near caretaker's garage
- Residential neighborhood directly across the street from the area of concern

Holy Trinity Cemetery (HTC)

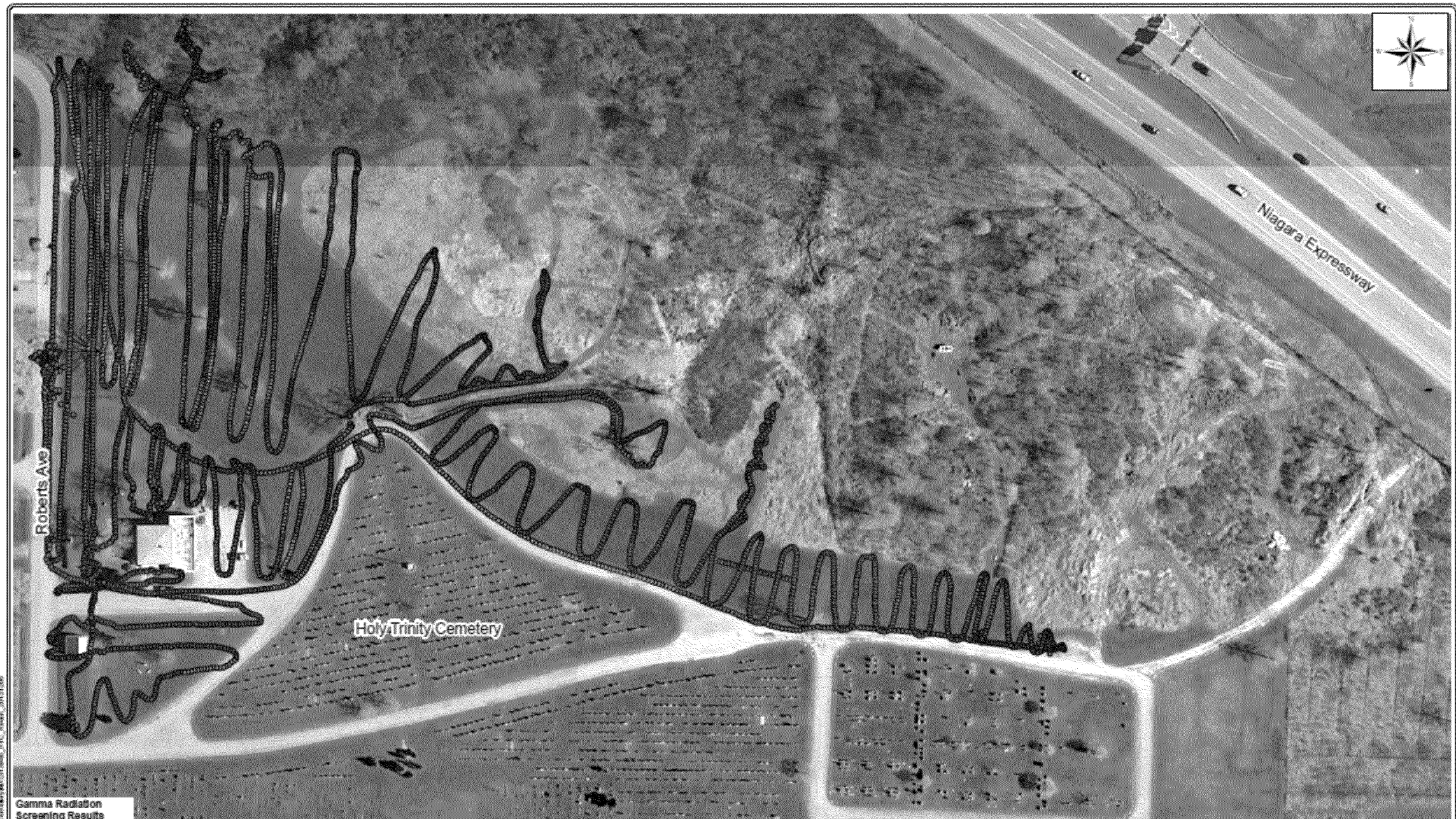
2006/2007 NYSDOH and NCDH radiological surveys

- Slag pile no longer present near caretaker's garage
- Reported that children from neighborhood play in the field
- Workers warned to avoid slag with mowers
- Another pile with somewhat elevated readings found on eastern edge of property with cemetery debris

Holy Trinity Cemetery (HTC)

2013 - 2014 EPA Pre-remedial Site Investigation

- Same as for NFB
- Highlights
 - Slag identified down to 8 in. depth
 - Ratios of individual isotopes were not consistent



Gamma Radiation
Screening Results
(Counts per Minute)

● Less Than 9,000

NOTES:
1. Background gamma radiation screening level is approximately 9,000 CPM.
2. Gamma radiation screening was conducted on 09/10/2013.
SOL/RC/SR



TITLE
Gamma Radiation Screening Results Map

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Location ID	Gamma Radiation Exposure Rate ($\mu\text{R/hr}$)
S12	9.385
S13	9.163
S01	134.01
S02	109.00
S03	239.436
S04	15.784
S05	342.544
S06	18.222
S07	238.968
S08	378.44
S09	17.128
S10	194.054
S11	281.822
HSPA1	13.014
HSPA2	11.532
HSPA3	11.018
HSPA4	11.566
HSPA5	11.424
HSPA6	11.482
HSPA7	10.328
HSPA8	16.362
HSPA9	11.058
HSPA10	19.872
HSPA11	12.610
HSPA12	15.898
HSPA13	16.424
HSPA14	19.548
HSPA15	11.552
HSPA16	12.35
HSPA17	11.61
HSPA18	11.71
HSPA19	11.496
HSPA20	12.068



Legend

Pressurized Ion Chamber (PIC) Gamma Survey Point

● Background

● < 2x Average Background

NOTES:

1. $\mu\text{R/hr}$ = microRöntgens per hour, as measured with Reuter-Stokes RSB-131 pressurized ion chamber.
2. The average background reading was 9.274 $\mu\text{R/hr}$.



NTLA

Holy Trinity Cemetery (HTC)

Changes to situation

- Children no longer use the field; neighborhood is made of mostly older people
- People walk dogs in the field
- Nobody lives in the caretaker's house any longer
- Former caretaker who previously lived in the house with children has returned without children (unsure if he is living in the house again)

Risk assessment

NFB

- Bowling alley workers – 45 mrem/yr (9×10^{-4})
- Office furniture store – 55 mrem/yr (1×10^{-3})

HTC

- Dog walkers – 26 mrem/yr (6.5×10^{-4})
- Cemetery workers – 32 mrem/yr (8×10^{-4})

Rad policy/guidance

EPA rad guidance

- Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination (“Luftig” memo - 1997)
 - Risk range 10^{-4} to 10^{-6}
 - 15 mrem/yr = 3×10^{-4} risk (became 12 mrem/yr)
- OSRETI (Stuart Walker)
- Removal guidance
- Research Regional removal rad approaches